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Gas Distribution Incidents: Understanding the Hazards

Hazards

Fires

Vehicles

Plumbers

The Cable Guy

Excavation

Appliances

A Presentation by

Cheryl J. Trench

Based on preliminary findings of an examination of gas distribution incidents, 1999-2003, prepared under contract to the Office of Pipeline Safety

Allegro Energy Consulting
P.O. Box 230592 ❖ New York, NY 10023
Phone: (212) 787-6923 ❖ Fax: (212) 721-9028
ctrench@rcn.com

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A Fresh Look at Incident Reports, 1999-2003

- Old broad cause categories made it difficult to assess real hazards
  - ➛ Damage by Outside Forces includes natural forces; excavation & mechanical damage; other outside force
    - ✓ Different hazards; different actors; different strategies
  - ➛ "Other" = 25%; the Black Hole of Information
- Earlier work highlighted the role of "other outside force": vehicles, fires
- New reporting form (early 2004) uses 7 1st-level and 25 2nd-level causes
- Approach: use operator's narrative to re-classify from old 5 causes to new 25 2nd-level causes

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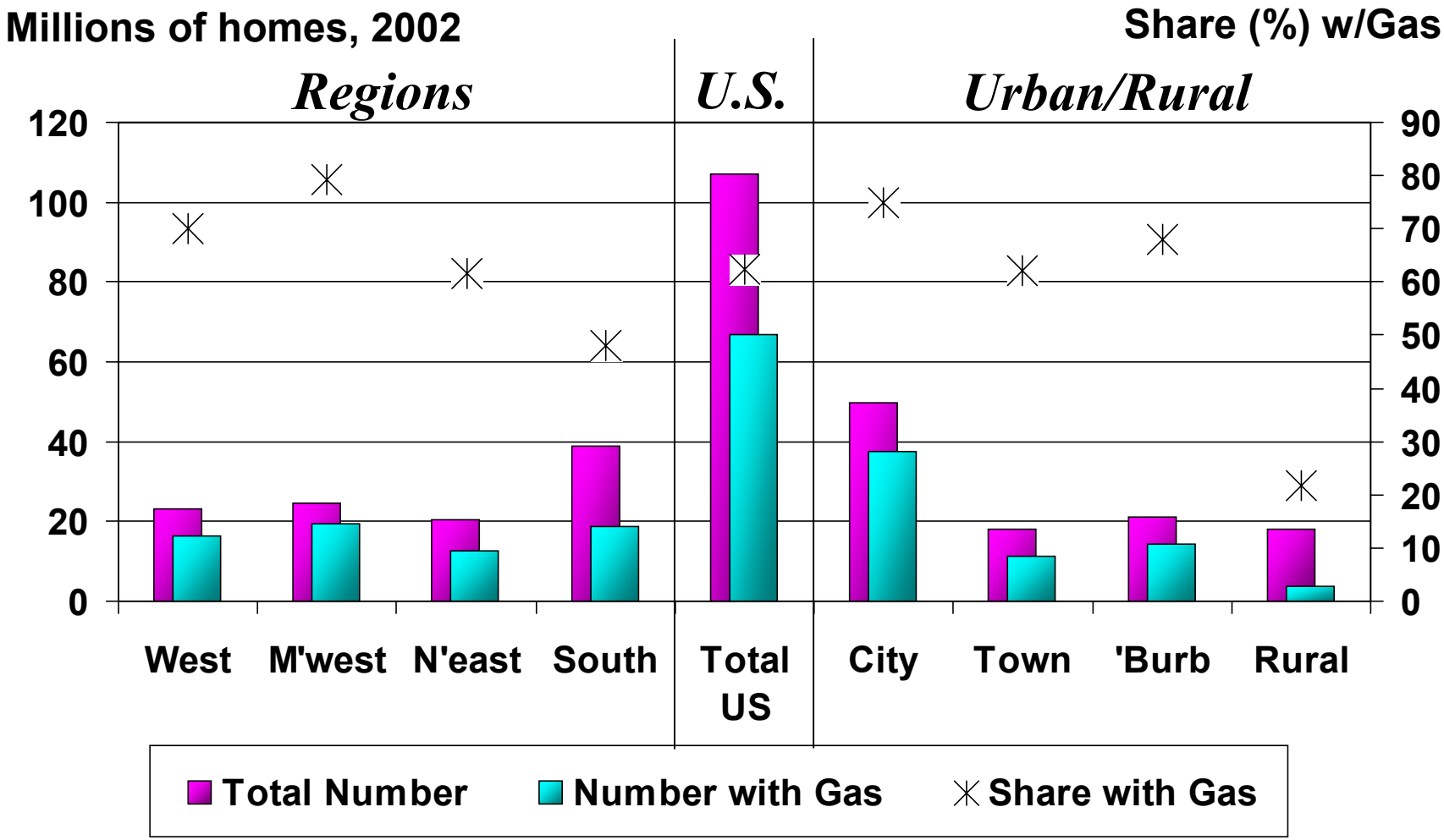
Natural Gas in >60% of U.S. Homes



Energy Information Administration, *Residential Energy Consumption Survey*, 2001

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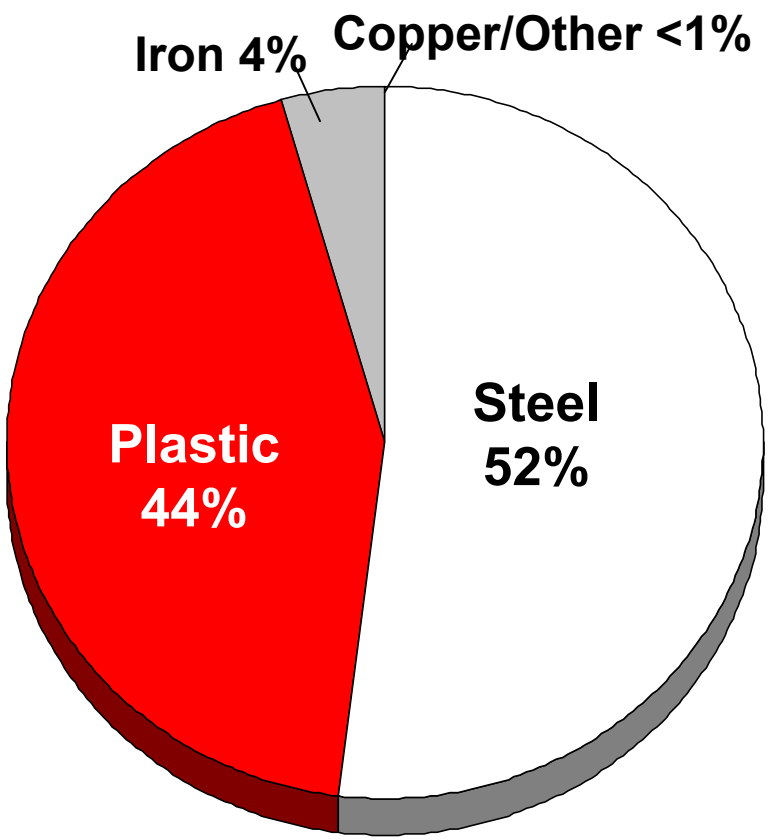
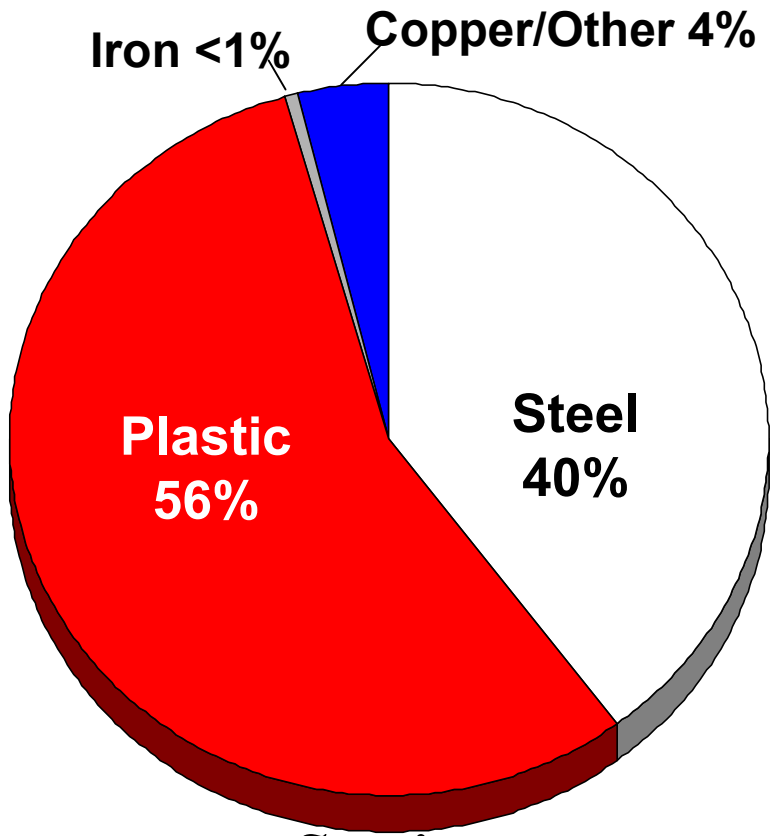
Mains and Services by Material, Average End-Year, 1999-2003



Mains

Average End-Year, 1999-2003

1.0 Million Miles



Services

Average End-Year, 1999-2003

56.1 Million Services

Source: RSPA Form 7100.1-1 (Gas Distribution Annual Report)

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RSPA Form 7100.1: Gas Distribution Incidents

- Event that involves a release of gas and
  - A death, or personal injury w/in-patient hospitalization,
  - Estimated property damage, including gas lost, of $50,000 or more
- Event that results in emergency shutdown of LNG facility
- Event that is significant in the judgment of the operator, even though it did not meet other criteria

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Reasons for Reporting

- **Of the 634 incidents reported, 1999-2003**
  - ✓33% involved a fatality or an injury
  - ✓48% of incidents reported for damage alone
  - ✓9% of incidents reported based on operator judgment only
  - ✓4% met damage threshold AND significant in view of oper.
  - ✓6% apparently not reportable
- **Retained all in analysis, even not reportable**

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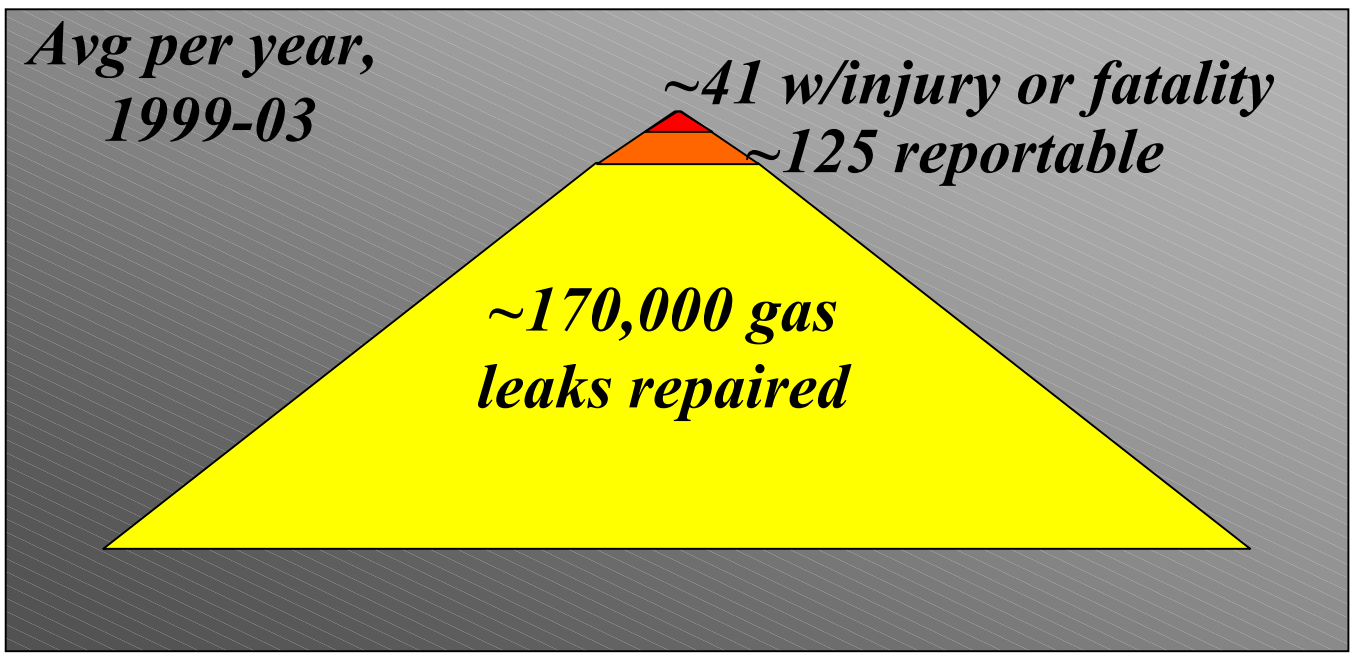
Do Not Read

Frequency of Consequence from Reportables

- **Shorthand: Only reportable if something bad happens; tens of thousands of leaks repaired each year without a reportable incident**



Source: RSPA Form 7100.1 and 7100.1-1, 1999-2003

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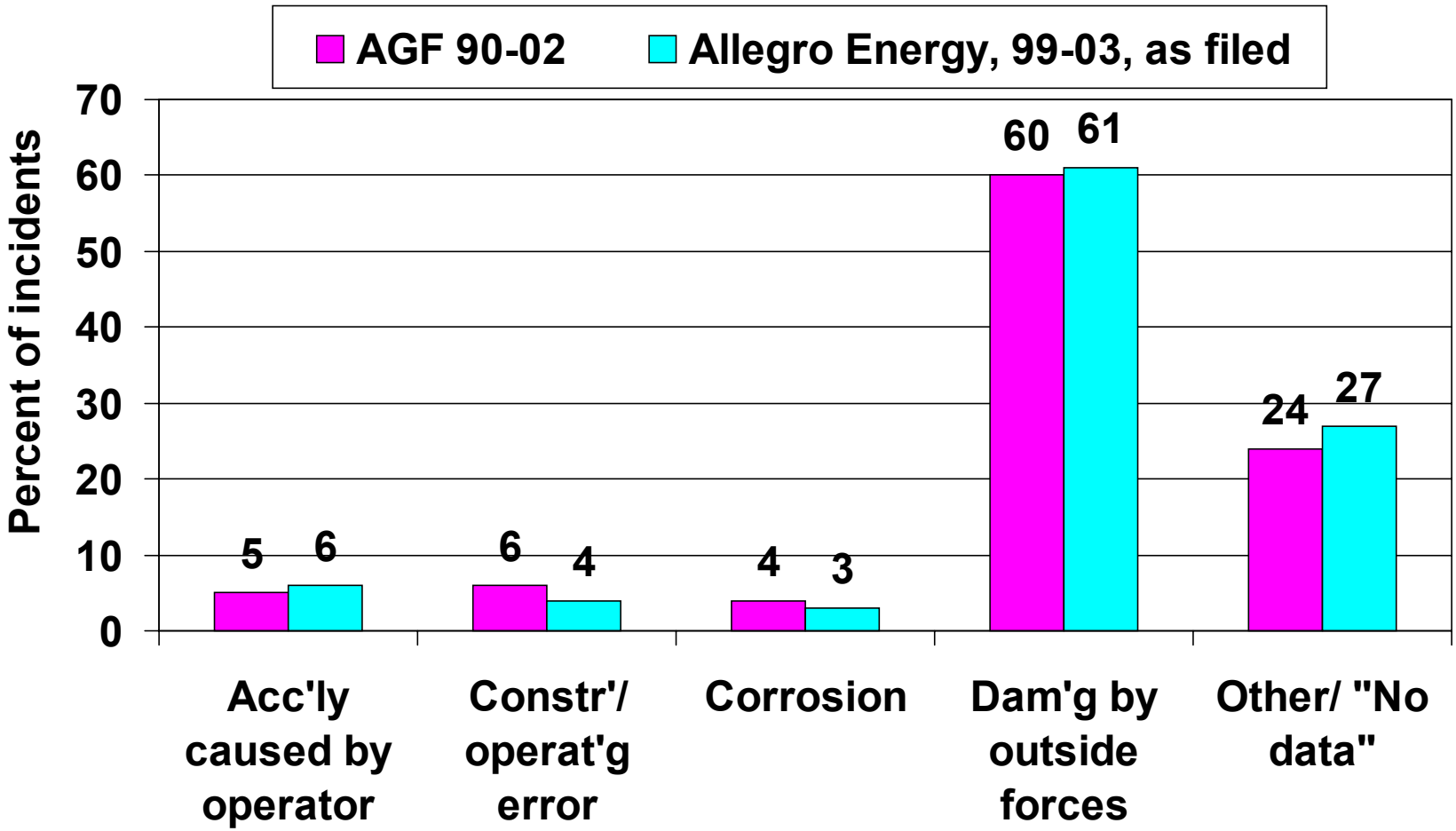
Old "Big Bucket" Causes: Similar 90-02 (AGF) and 99-03 (Allegro Energy)



AGF: Based on compilation of gas distribution incidents by American Gas Foundation (in publication)

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The New Causes: Seven 1st-Level, 25 2nd-Level

- **F1 - Corrosion**
  - 1) External; 2) Internal
- **F2 - Natural Forces**
  - 3) Earth; 4) Lightning; 5) Rains/Floods; 6) Temperature; 7) Winds
- **F3 - Excavation**
  - 8) Operator; 9) Third Party
- **F4 - Other Outside Force Damage**
  - 10) Fire First; 11) Vehicle; 12) Prev. Dam'g'd Pipe; 13) Vandalism
- **F5 - Materials or Welds**
  - Mat'l: 14)pipe, 15)component, 16)joint; Weld: 17)butt, 18)fillet, 19)seam
- **F6 - Equipment or Operations**
  - 20) Malfunction; 21) Threads; 22) Seals; 23) Incorrect operation
- **F7 - Other**
  - 24) Miscellaneous; 25) Unknown

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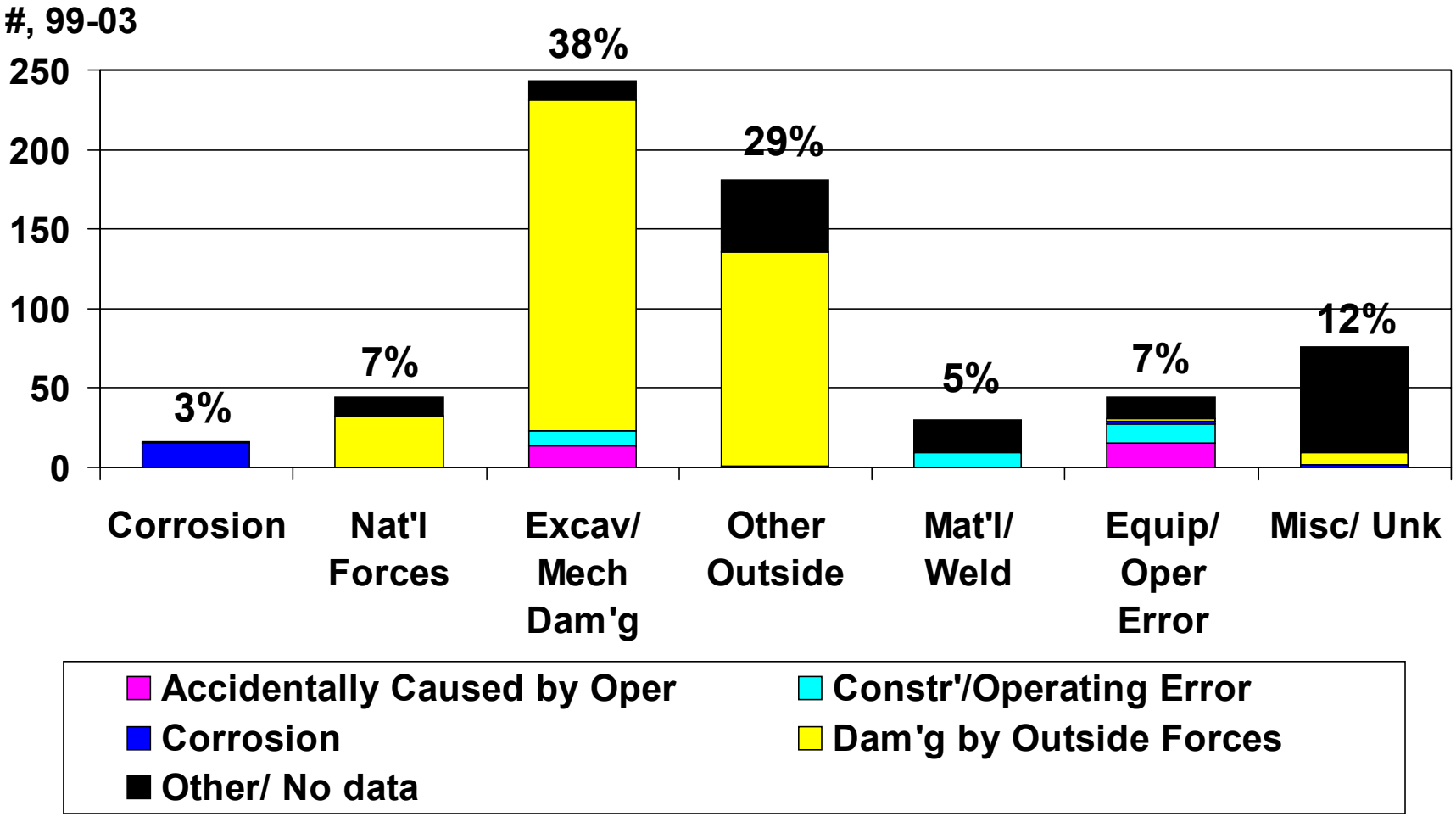
From the Old Big Buckets to the New Big Buckets (i.e., 1st-Level Causes)



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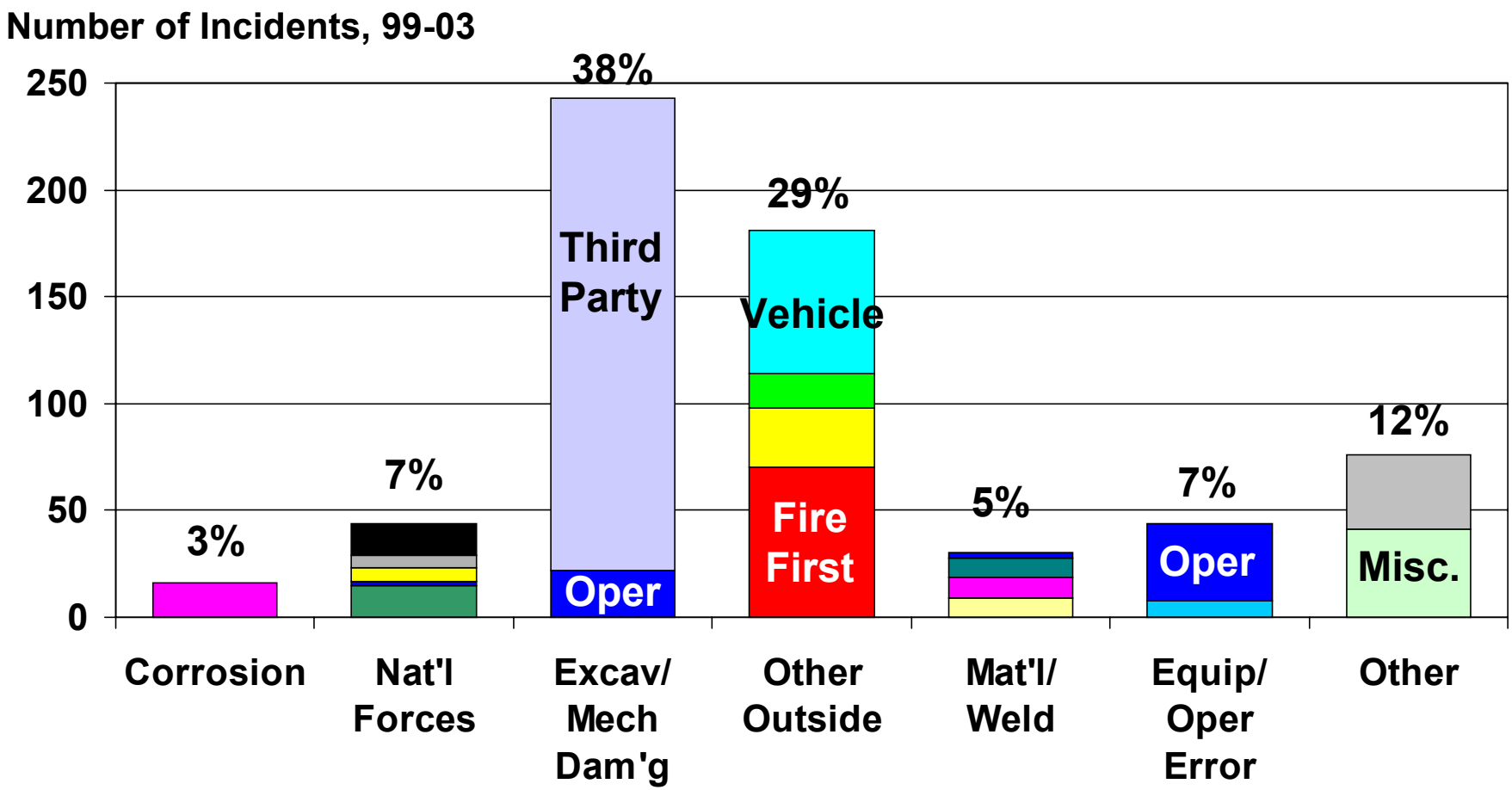
And Now, the New Small Buckets (i.e., 2nd-Level Causes): Hazards, Actors



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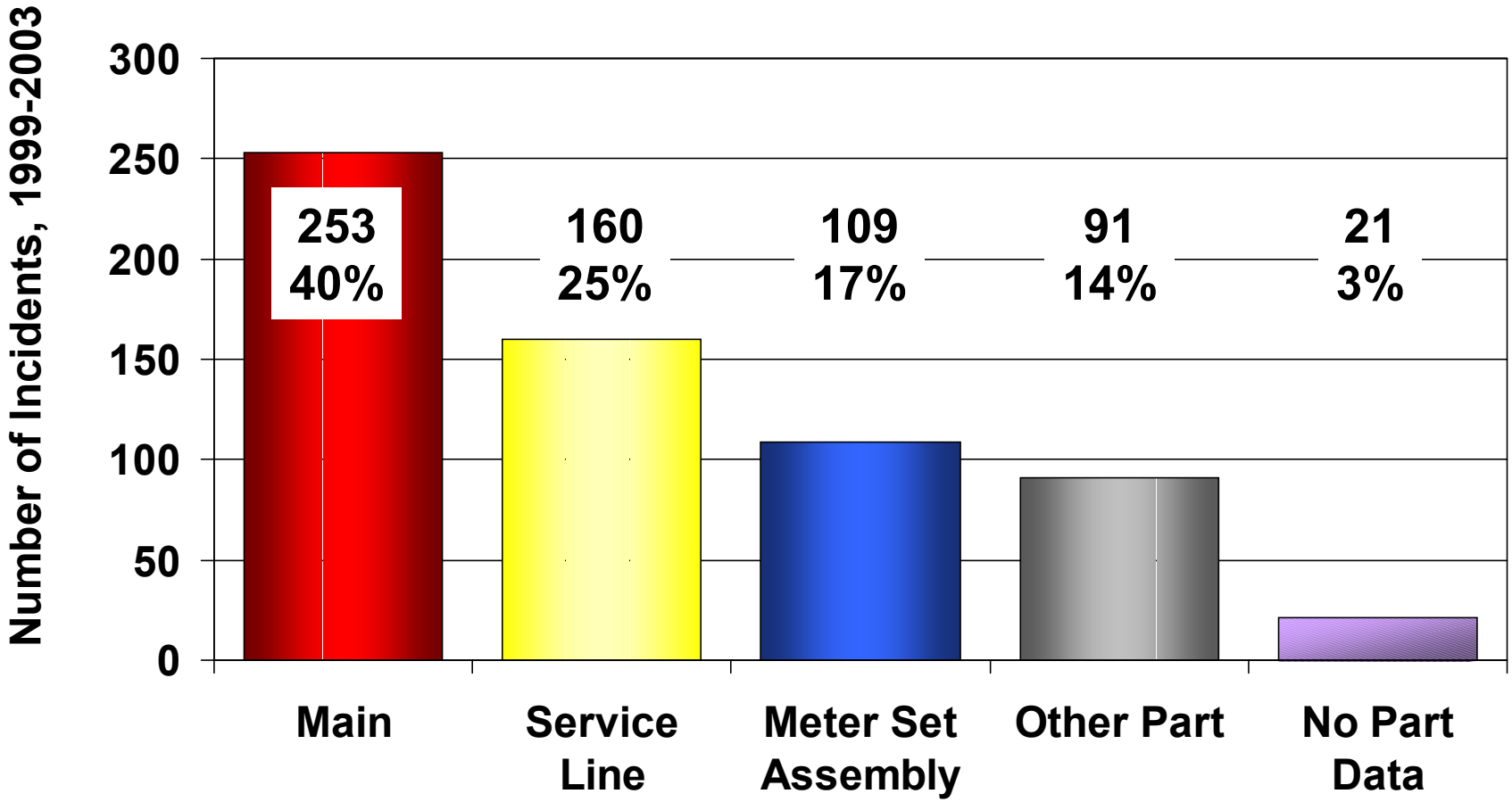
System Part Involved



Based on RSPA 7100.1 filings

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Drilling Down: Excavation/Mechanical Damage

- 243 incidents of 634; 38% total; 35% Third Party/4% Operator
- Includes traditional excavation and mechanical damage
  - Construction; sewers; road grading
  - The cable/phone guy
  - Also includes plumbers and others
- About 3/4 are activities that would require One-Call
- Not the whole "outside force" story

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Drilling Down: Fire First

- 70 incidents of 634: 11%
- An event where a building is on fire and the utility responds, but the fire is not a result of a gas leak.
- A house fire that is not caused by a gas leak is arguably not a "gas incident," and it does not represent a failure of the utility to control a hazard.
- Inconsistent reporting
  - Over-represented in Alaska with Enstar at 25 of 70 incidents; Other companies are not reporting in this manner (next highest is 8; most, if any, are 1 or 2).
  - This clear inconsistency undermines this category's usefulness in assessing true hazards.

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Drilling Down: Vehicles

- 67 incidents of 634; 11%; 25% of fatalities
- Not a failure of gas system
- Accidents; some DUI; some roll-aways
- Mainly meter set assemblies (44); service lines (12); “other” system part (9)

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Drilling Down: "Miscellaneous" and Customer Piping

- 41 incidents of 634; ~7%
- About half involves customer piping and appliances: non-jurisdictional
- Varied – well, "miscellaneous" causes
- Customer piping/appliances are 38 of total incidents; most are misc. (21) or unknown (4)

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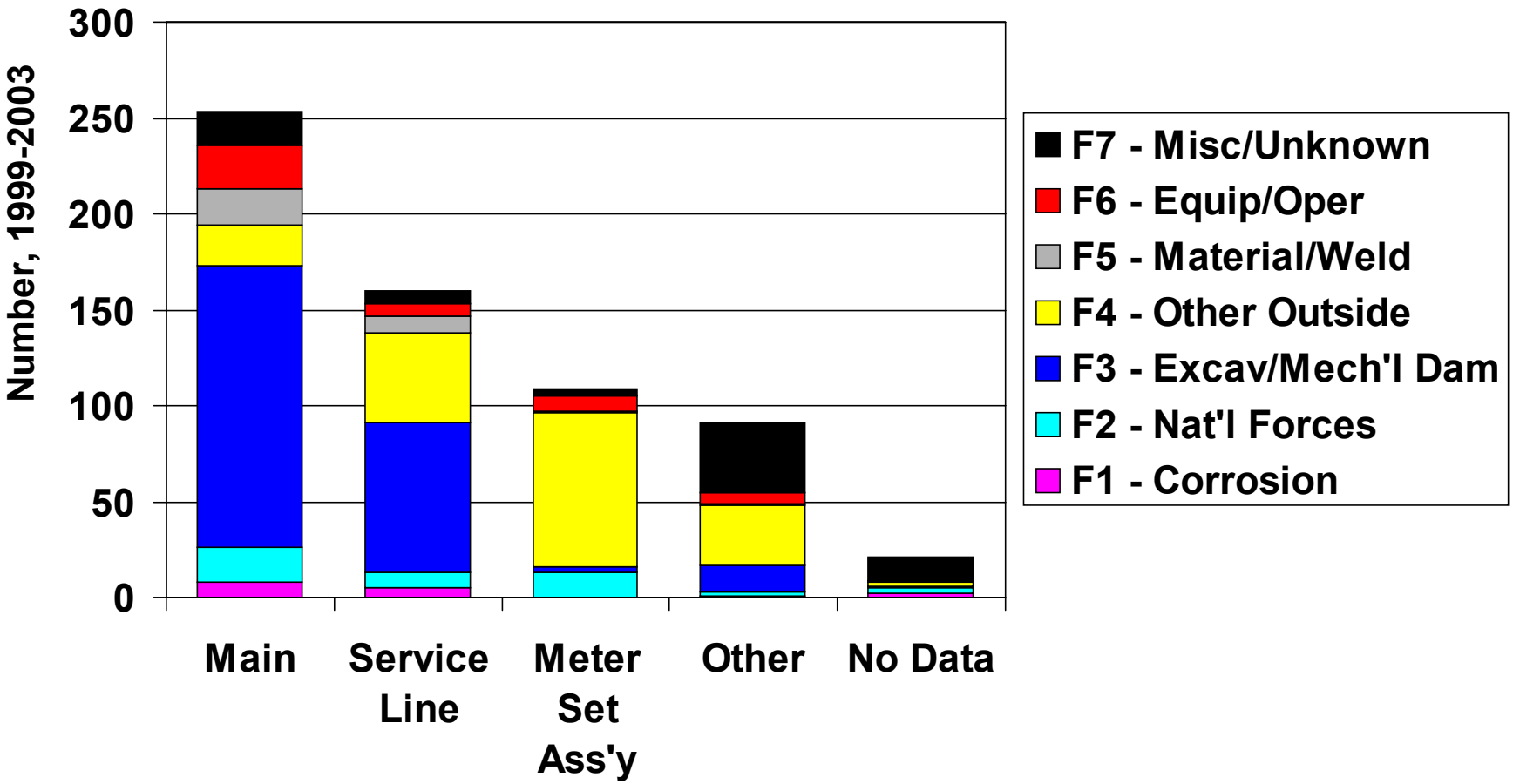
System Part by 1st-Level Cause



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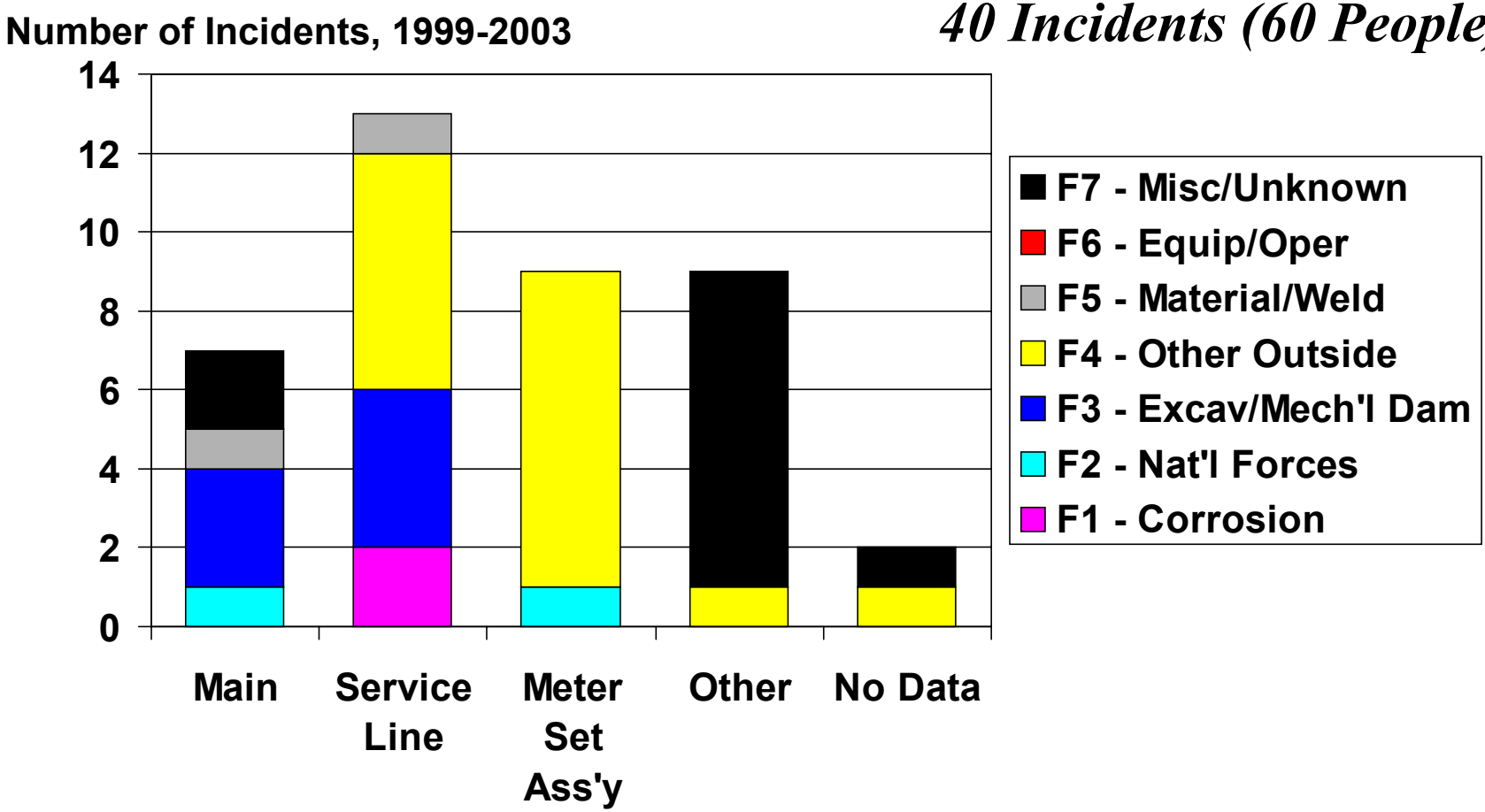
Fatality Incidents by Part by Cause

40 Incidents (60 People)



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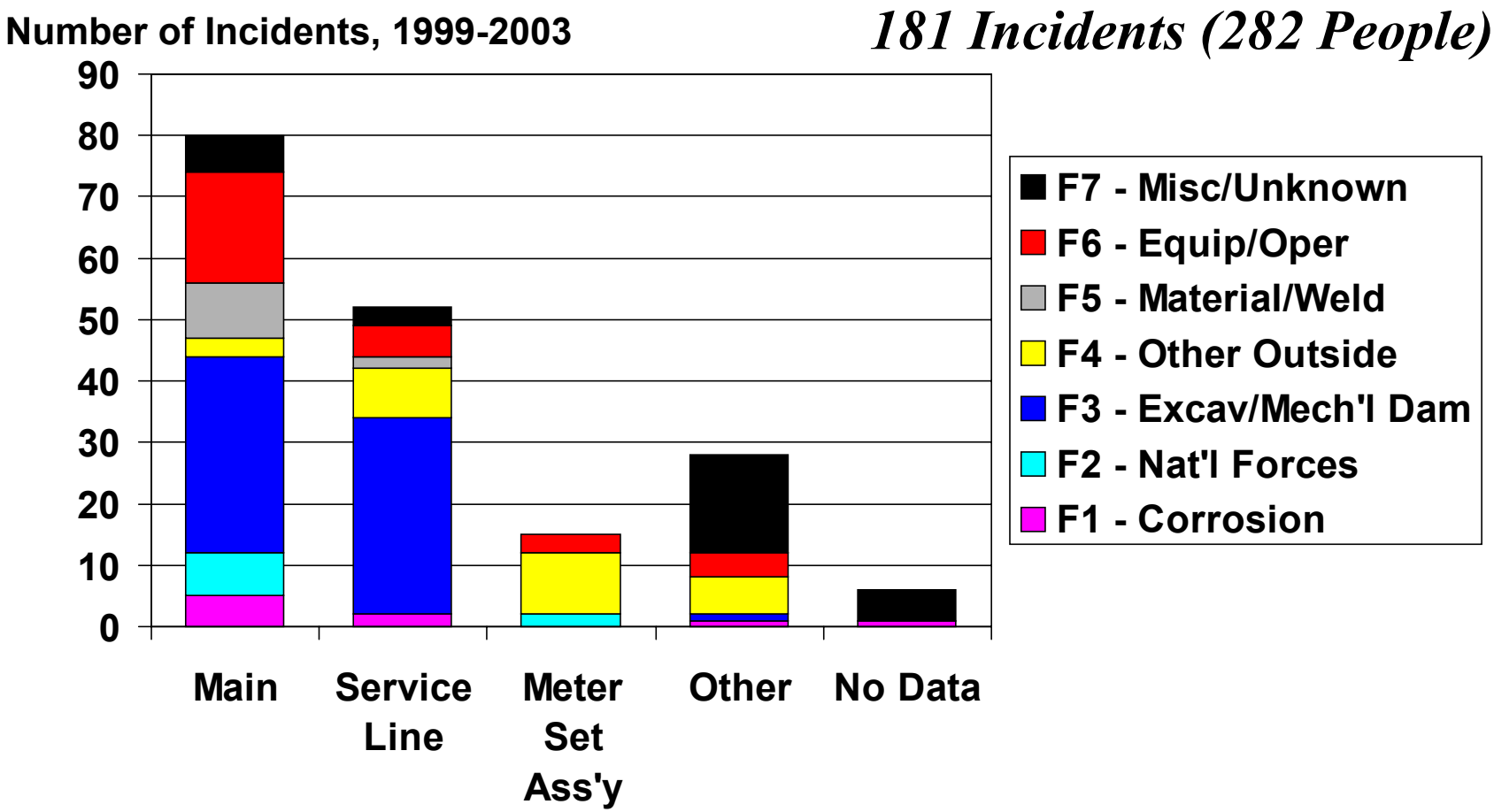
Injuries by Part by Cause



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Summary: Diverse Hazards Will Require Diverse Strategies

- Additional detail on causes is critical to enhancing safety
- Many incidents not failures of gas system
- Many incidents not on DOT-jurisdictional facilities
- Enhancing safety will require broad partnerships of stakeholders, including
  - DOT
  - Operators
  - States
  - Other utilities; building trades; developers; architects
  - Homeowners and other customers